Surgical approach by cervicosternolaparotomy for the treatment of extended cervical stenoses after reconstruction for caustic injury

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Surgical treatment of extended cervical stenoses after esophagoplasty for caustic injury usually requires interposition grafts or flaps. These procedures have been used with limited success because of transplant necrosis and anastomosis fistula and stricture. Here, we describe an alternative technique consisting in the complete release of the transplant by a cervicosternolaparotomy approach to allow its advancement followed by primary anastomosis.

Operative Procedure

A comprehensive cervical exploration through the previous cervical incision is performed to ascertain that stenosis is not suitable for repair by a limited cervical approach. Then, before proceeding to sternotomy, a midline laparotomy is required. The laparotomy can be justified as follows: (1) Importantly, it allows complete dissection of the abdominal part of the transplant and of its vascular pedicle up to its origin, which provides a significant gain in length; (2) it allows the cephalad mobilization of the duodenocolonostomy or jejunocolonostomy; and (3) it gives safe access to the intramediastinal part of the transplant at the lower end of the substernal space. Sternotomy is best conducted in a cephalad direction. The anterior side of the transplant is

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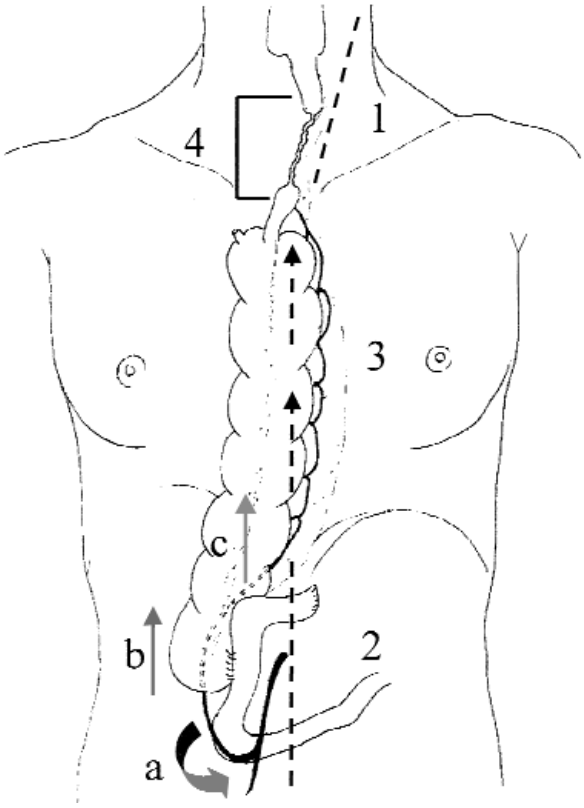

Figure 1. Operative procedure. Cervical exploration *(1).* Midline laparotomy *(2).* Complete dissection of the vascular pedicle *(a).* Cephalad mobilization of the coloduodenostomy *(b).* Access to the lower end of the substernal space *(c).* Sternotomy conducted in a cephalad direction and release of the transplant in the anterior mediastinal space *(3).* Excision of the stenosis and new anastomosis *(4).*

TABLE 1. Initial esophagoplasty, treatments of stenoses, and outcome

Patient	Initial intervention*	Location of secondary stenosis	Previous treatments before reintervention	Timing of reintervention†	Type of reintervention	Outcome‡
1	Ileocolonoplasty, esophagoileostomy	Esophagus and anastomosis	Endoscopic dilations, surgical bougienage, endoprosthesis	41	Transplant ascension	Cervical fistula; normal feeding at 17 mo
2	Ileocolonoplasty, esophagoileostomy	Esophagus and anastomosis	Endoscopic dilations	6	Left colonoplasty	Normal feeding; death at 12 mo
3	Right colonoplasty, pharyngocolonoplasty	Pharynx and anastomosis	None	9	Transplant ascension	Reintervention for biliary reflux; normal feeding at 10 mo
4§	Left colonoplasty, esophagocolonostomy	Colonoplasty	None	1	Gastroplasty	Normal feeding at 60 mo
5	Right colonoplasty, pharyngocolonoplasty	Pharynx and anastomosis	None	9	Transplant ascension	Reintervention for biliary reflux; normal feeding at 12 mo
6	Ileocolonoplasty, pharyngoileostomy	Pharynx and anastomosis	Anastomosis repairs, musculocutaneous flap, free jejunal transplant	84	Transplant ascension	Normal feeding at 12 mo
7	Right colonoplasty, esophagocolonostomy	Esophagus and anastomosis	Endoscopic dilations, surgical bougienage, anastomosis repairs	156	Transplant ascension	Cervical fistula; stenosis recurrence; blenderized diet at 40 mo
8	Transverse colonoplasty, esophagocolonostomy	Colonoplasty and anastomosis	Endoscopic dilations, surgical bougienage, endoprosthesis	20	Ileocolonoplasty	Normal feeding at 18 mo

*Types of esophagoplasty and cervical anastomosis at initial operation.
†Delay in months between diagnosis of stenosis and reintervention.
‡Postoperative complications, long-term function, and follow-up in months after reintervention.
§Patient with caustic injury to a previous colonoplasty.

released step by step from the internal part of the sternum before progressive sternal section. Then, complete transplant release is performed in the anterior mediastinal space with special attention to its vascular pedicle. The stenosis and all scar tissue are excised and a new anastomosis is performed in healthy tissue. The sternal manubrium and the head of the left clavicular bone are removed to open the upper thoracic inlet wide to avoid transplant compression.

Patients

Between 1995 and 1999, 8 patients (6 male and 2 female; median age 32 years) were operated on according to the technique described herein. Types of initial transplants, all routed substernally, and primary anastomoses are summarized in Table 1. Five patients had undergone several previous attempts at stenosis removal (Table 1). All these procedures were followed by short-term stenosis recurrence, and two esophageal endoprostheses were complicated by migration and hemorrhage, respectively. Preoperative investigations consisted of standard laboratory tests, a chest radiogram, endoscopic examination of the upper digestive tract, and a barium swallow.

Results

In 5 patients, median length gain obtained by transplant release was 6 cm (range 4-9 cm), allowing a primary anastomosis. Attempt at transplant preservation failed in 3 patients, because of the length of the stenosis (2 patients) or injury to the transplant vascular pedicle (1 patient). In these cases, initial colonoplasty was replaced by another transplant during the same operation. Operative mortality was nil. Two transient cervical fistulas occurred. Two patients had major biliary reflux and underwent subsequent duodenal diversion. Median follow-up after revision was 12 months (range 10-60 months). Seven patients resumed normal feeding without further treatment. Stenosis recurred after cervical fistula in the last patient. She underwent 3 sessions of endoscopic dilations and was eating a blenderized diet at the end of follow-up.

Discussion

In the particular setting of caustic injury, stenosis of the upper digestive tract after esophagoplasty may result from delayed progressive caustic scarring of tissue or from the incomplete excision of scar tissue at the time of reconstruction. Such stenoses are difficult to treat because of their extent and the need to complete fibrot-

ic tissue removal. Transplant stenoses related to partial ischemia or other causes represent the same therapeutic challenge. Limited anastomosis repair without total fibrosis excision is usually followed by short-term recurrence of stenosis.[1,2] To succeed, reoperation should include complete excision of scar tissue before a new anastomosis is performed. Wu and associates[3] have developed the idea of transplant release by sternotomy in 3 patients. However, this approach did not allow treatment of strictures longer than 2.5 cm. In contrast, additional abdominal transplant release brings a significant advantage. The length of the vascular pedicle is the limiting factor for transplant mobilization. Despite the impression that tension of the pedicle is tight, complete dissection up to its origin always provides a length gain. In most cases, it is likely that extended pedicle dissection had not been performed at the time of esophagoplasty. Another explanation may reside in the loosening of the vascular pedicle over time. In 5 of 8 patients, this procedure allowed preservation of the initial transplant. In the other 3 patients, transplant preservation failed, but this surgical approach allowed its safe excision and a successful secondary esophagoplasty during the same operation. Even in the case of major surgery, mortality was nil, morbidity was exceptionally low, and a high success rate was obtained with this technique.

References

1. MacLear PW, Hayden RE, Muntz HR, Fredrickson JM. Free flap reconstruction of recalcitrant hypopharyngeal stricture. *Am J Otolaryngol.* 1991;12:76-82.
2. Rabuzzi DD, Camp HL. Repair of hypopharyngeal stenosis. *Arch Otolaryngol.* 1993;97:256-8.
3. Wu MH, Lai WW, Lin MY, Chou NS. Prevention and management of strictures after hypopharyngocolostomy or esophagocolostomy. *Ann Thorac Surg.* 1994;58:108-11.